SOCIETY FOR VASCULAR SURGERY® DOCUMENTS

Setting high-impact clinical research priorities for the Society for Vascular Surgery

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With the overall goal of enhancing the effectiveness and efficiency of vascular care, the Society for Vascular Surgery (SVS) recently completed a process by which it identified its top clinical research priorities to address critical gaps in knowledge guiding practitioners in prevention and treatment of vascular disease. After a survey of the SVS membership, a panel of SVS committee members and opinion leaders considered 53 distinct research questions through a structured process that resulted in identification of nine clinical issues that were felt to merit immediate attention by vascular investigators and external funding agencies. These are, in order of priority: (1) define optimal management of asymptomatic carotid stenosis, (2) compare the effectiveness of medical vs invasive treatment (open or endovascular) of vasculogenic claudication, (3) compare effectiveness of open vs endovascular infrainguinal revascularization as initial treatment of critical limb ischemia, (4) develop and compare the effectiveness of clinical strategies to reduce cardiovascular and other perioperative complications (eg, wound) after vascular intervention, (5) compare the effectiveness of strategies to enhance arteriovenous fistula maturation and durability, (6) develop best practices for management of chronic venous ulcer, (7) define optimal adjunctive medical therapy to enhance the success of lower extremity revascularization, (8) identify and evaluate medical therapy to prevent abdominal aortic aneurysm growth, and (9) evaluate ultrasound vs computed tomographic angiography surveillance after endovascular aneurysm repair. (J Vasc Surg 2013;57:493-500.)

In the fall of 2010, the Society for Vascular Surgery (SVS) Research Council proposed to the SVS Board of Directors that the Society intensify its emphasis on clinical research through several initiatives that have now been adopted and implemented: (1) establish a process by which investigator-initiated clinical research projects could be formally reviewed by the SVS and receive a statement of approval that might improve the chances of receiving extramural research funding, accelerate subject recruitment, and study completion[1]; (2) create a funding mechanism to facilitate development, preparation, and submission of investigator-initiated multicenter clinical trial proposals—a planning grant[2]; and (3) delineate clinical research priorities for the SVS to guide research strategy and investment over the next 5 years. This proposal included an electronic survey of all SVS members then convening a stakeholder's conference where a broad cross-section of SVS leadership determined the final prioritization.

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This report describes the process by which initiative #3 was accomplished.

The notion that the SVS should set for itself clinical research priorities and also make recommendations to the broader vascular community regarding these priorities was stimulated by the release of the report "Initial National Priorities for Comparative Effectiveness Research" by the Institute of Medicine (IOM).[3]

For the purposes of this activity, the IOM's definition of comparative effectiveness research (CER) was adopted:

"Comparative effectiveness research (CER) is the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve the delivery of care. The purpose of CER is to assist consumers, clinicians, purchasers, and policy makers to make informed decisions that will improve health care at both the individual and populations levels."[3]

While CER encompasses population health care, the SVS emphasizes that the surgeon's primary obligation is to the individual patient. Although CER has clearly assumed national importance, the SVS also recognizes that there is still important clinical research to be done in many areas of vascular disease that do not necessarily meet the strict definition of CER. Thus, during this activity, non-CER clinical research priorities were included.

METHODS

SVS member survey on clinical research needs. From the beginning, the Research Council sought to make

the identification of unanswered clinical questions in vascular disease a "grass roots" activity. To that end, two distinct surveying efforts were carried out. The first (spring of 2011) was patterned after that used by the IOM to solicit feedback regarding the national CER priorities.[3] Later (summer of 2011), an abridged version of the survey instrument was distributed again to the entire SVS membership merely asking them to state in the form of a question clinical issues where better evidence was needed to guide patient care.

Then, survey results were reviewed by the Research Council, which eliminated duplicates and grouped similar responses into more generally framed questions and then categorized them into the following themes: (1) carotid disease, (2) aortic disease, (3) mesenteric and renal artery disease, (4) peripheral arterial disease, (5) dialysis access, (6) venous disease, and (7) medical management of vascular disease and risk factor modification.

The Research Council, in consultation with the Executive Committee, then organized a stakeholder's meeting to review results of the membership survey. The SVS members recognized as opinion leaders in the seven categories listed above were recruited to review the submitted survey responses for completeness, making sure that the major outstanding questions in each theme were represented in the set of responses from the membership survey. Chairs of SVS committees whose missions were relevant to clinical research were also asked to select one or two representatives from their committee to attend this meeting.

Stakeholders' meeting. The SVS Clinical Research Priorities Meeting was convened in Chicago, Illinois, on October 14-15, 2011. Attendees comprised 38 SVS members who were serving in Society leadership positions or had established reputations in vascular research (Table I).

During the first half-day of the meeting, the participants were provided an overview of the economic considerations in clinical vascular research, followed by focused presentations by thought leaders in each of the seven identified content areas (see Table I for speakers). Each speaker was tasked to address the following elements relative to their assigned content area: What is the incidence/prevalence of disease in that area? What is the cost of caring for disease in that area? How good is the current evidence that guides decision making in that area? What major unanswered questions exist in that area? What trials are currently underway addressing unanswered questions in that area?

During the second half-day of the meeting, participants were divided into six groups with six to seven members, and each group reviewed and scored at least two-thirds of the research topics submitted for prioritization using a standard tool (Fig). The process ensured that each research question was scored by at least four groups. Scores were tallied, and questions receiving the highest scores were submitted for final prioritization during the next session.

The last half-day of the meeting consisted of a plenary session where a variation of the Improved Nominal Group Technique of decision making was used.[4] This decision-making process is designed to allow each member of a group the opportunity to voice his or her opinion, but it also empowers less vocal members of the group to influence the final decision through proportional voting.

A list of the top scoring questions as determined by the small groups was distributed to all meeting attendees. In plenary session, each question was individually reviewed, and opinions for or against high prioritization were solicited. After this discussion period, each participant was given 20 "virtual" dollars to "spend" on the research topics they felt should receive highest emphasis by the SVS. Participants were free to spend all their money on a single, high-priority topic, or they could spread their spending on as many topics as they felt appropriate. The final results of the voting (as tallied by the amount of virtual money the participants invested in each topic) were again presented in a plenary session before adjournment in order to confirm consensus regarding the final ranking.

Table I. SVS clinical research priorities stakeholders' meeting

Participants	
B. Timothy Baxter	
Richard Cambria	
Alexander Clowes	
Elliot Chaikof	Speaker, aortic disease
Mark Conrad	
Michael Conte	
Jack Cronenwett	
R. Clement Darling	
Mark Davies	
Randolph Geary	
Patrick Geraghty	
David Gillespie	
Peter Gloviczki	
Kimberley Hansen	Speaker, renal/mesenteric disease
Peter Henke	Speaker, medical management/risk factors
Thomas Huber	Speaker, dialysis access
Melina Kibbe	
Larry Kraiss	
Greg Landry	
Mark Meissner	Speaker, venous disease
Joseph Mills	
Greg Moneta	
Nicholas Morrissey	
Peter Nelson	
Louis Nguyen	Speaker, economic considerations
Christopher Owens	
C. Keith Ozaki	
Richard Powell	
Amy Reed	
John Ricotta	Speaker, carotid disease
Caron Rockman	
Russell Samson	
Andres Schanzer	
Marc Schermerhorn	
Michael Stoner	Speaker, peripheral arterial disease
Ravi Veeraswamy	
Omaida Velazquez	
Rodney White	

QUESTION:

Clinical Need

- The importance of the answer in providing needed evidence to optimally manage the clinical problem in an individual patient.
- Range 1-10
  - 1 = the answer will only minimally increase the evidence available
  - 5 = the answer will modestly increase the evidence available
  - 10 = the answer is critical to optimal patient management

Public Health Impact

- The importance of the answer in optimizing the care of the population susceptible to vascular disease
- Range 1-10
  - 1 = the answer will affect the clinical management of a small group of patients
  - 5 = the answer will affect the clinical management of a moderate group of patients
  - 10 = the answer will affect the clinical management of a large group of patients

Economic Impact

- The importance of the answer in choosing between therapeutic options that vary significantly in cost, even if only a small to moderate group of patients are affected
- The importance of the answer in choosing between therapeutic options that vary little or modestly in cost but affect a large group of patients
- Range 1-10
  - 1 = the answer will have a small impact on health care costs in vascular patients
  - 5 = the answer will have a modest impact on health care costs in vascular patients
  - 10 = the answer will have a large impact on health care costs in vascular patients

Feasibility

- The ease of obtaining the answer in terms of:
  - Trial complexity
  - Estimated costs of the trial
  - Ethical issues/equipoise
- Range 1-10
  - 1 = the trial necessary to obtain the answer is not feasible (too costly, too complex, impossible to enroll sufficient numbers of subjects)
  - 5 = the trial necessary to obtain the answer is feasible but one or more significant obstacles exist (cost, complexity, enrollment challenges)
  - 10 = the trial necessary to obtain the answer is straightforward (why has it not already been done?)

Fig. Small group question evaluation tool.

Postmeeting feedback. After the stakeholders' meeting, a questionnaire was circulated to the attendees asking them for their thoughts regarding the validity and value of the entire process.

RESULTS

SVS member survey results. The two SVS member surveys generated 192 distinct responses. After review of the raw data by the Research Council and the selected thought leaders, a final set of 53 topics in seven content areas (Table II) was developed for consideration at the stakeholders' meeting.

Stakeholders' meeting presentations. The content of the speaker presentations can be viewed at http://www.vascularweb.org/research/clinicalresearch/Pages/Clinical-Research-Priorities-.aspx.

Small group scoring outcome. The results of the small group exercise are presented in Table III. A more complete report of the small group exercise, including component scores as well as the number of reviewers who scored each question, is available at http://www.vascularweb.org/research/clinicalresearch/Pages/Clinical-Research-Priorities-.aspx.

The Research Council met after the small group exercise to review the scores and selected the 19 top scoring

Table II. Questions for small group review

Carotid artery disease (31 original questions)
- C1. Compare effectiveness of CEA vs CAS for *asymptomatic* stenosis
- C2. Compare effectiveness of CEA vs CAS for *symptomatic* stenosis
- C3. Compare effectiveness of invasive intervention (CEA or CAS) with medical therapy for *asymptomatic* carotid stenosis
- C4. Compare effectiveness of invasive intervention (CEA or CAS) with medical therapy for *symptomatic* carotid stenosis
- C5. Define clinical and anatomic characteristics in asymptomatic carotid stenosis patients that place them at high risk for stroke
- C6. Define cost-effective algorithms for imaging carotid disease
- C7. Compare observational vs interventional treatment for postintervention carotid restenosis
- C8. Define the role of simultaneous carotid-CABG revascularization
- C9. Define the optimal management of patients with low-frequency carotid artery-related pathologies (eg, hyperperfusion syndrome, dissections, FMD)

Aortic disease (29 original questions)
- A1. Compare effectiveness of open vs endovascular repair of ascending and arch aortic aneurysms
- A2. Compare effectiveness of open vs endovascular repair of thoracoabdominal aneurysms (assume stratification by extent)
- A3. Evaluate US vs CTA surveillance post-EVAR
- A4. Compare treatment vs observation in AAAs measuring 5.5-6.0 cm in diameter
- A5. Determine the natural history of AAAs measuring 5.0-5.5 cm in diameter
- A6. Compare effectiveness of open vs endovascular repair of acute type B aortic dissections
- A7. Compare effectiveness of open vs endovascular repair of chronic type B aortic dissections
- A8. Identify and evaluate medical therapy to prevent AAA growth
- A9. Establish guidelines for screening and define the "high-risk" small AAAs (<5.5 cm)

Mesenteric/renal disease (10 original questions)
- R1. Compare effectiveness of medical therapy vs stenting of severe renal artery disease stratified by presence of hypertension and renal insufficiency
- R2. Compare effectiveness of open vs endovascular mesenteric revascularization

Peripheral arterial disease (72 original questions)
- P1. Compare effectiveness of initial open vs endovascular infrainguinal revascularization for CLI
- P2. Compare effectiveness of staged vs simultaneous amputation in patients undergoing lower extremity revascularization with toe or forefoot gangrene
- P3. Define and evaluate novel strategies for management of unreconstructible CLI including cell- and gene-based therapy
- P4. Define the role of primary amputation in CLI
- P5. Identify the factors predicting successful prosthetic rehabilitation after lower extremity amputation
- P6. Develop algorithms for cost-effective use of lower extremity revascularization in CLI
- P7. Compare effectiveness of medical vs invasive therapy (open or endovascular) for claudication
- P8. Define the role of infrapopliteal revascularization in diabetics before clinical CLI develops
- P9. Compare effectiveness of initial open vs endovascular infrainguinal revascularization for claudication
- P10. Develop algorithms for cost-effective use of lower extremity revascularization in claudication
- P11. Compare duplex vs arteriography as completion study after surgical lower extremity bypass
- P12. Define best medical antiplatelet therapy after intervention for PAD
- P13. Evaluate effectiveness of duplex scanning as a surveillance tool to identify and treat asymptomatic recurrence after endovascular intervention
- P14. Evaluate methods of diagnosing and treating lower extremity entrapment syndromes
- P15. Compare open vs endovascular management of popliteal aneurysms
- P16. Develop validated quality-of-life measures for patients with vascular disease

Dialysis (16 original questions)
- D1. Develop a comprehensive cost-effective algorithm for hemodialysis access
- D2. Define the optimal form of dialysis access for patients with unsuitable or failed forearm fistulas
- D3. Compare the effectiveness of secondary interventions to preserve existing dialysis access fistulas and grafts
- D4. Define the optimal approach for dialysis access in-patient with central venous stenosis
- D5. Determine the effectiveness of strategies to enhance AV fistula maturation
- D6. Compare the overall effectiveness of single-stage vs two-stage basilic vein transposition for hemodialysis access

Table II. Continued.

Venous (27 original questions)
- V1. Determine whether prophylactic IVC filter use reduces PE/death compared with other methods of VTE prophylaxis, duplex surveillance, or both
- V2. Compare the outcomes of treated calf DVT with the natural history of untreated calf DVT
- V3. Develop best practices for management of chronic venous ulcer
- V4. Compare the effectiveness of compression therapy or ablation with natural history in patients with superficial venous insufficiency
- V5. Evaluate chronic cerebrospinous venous insufficiency as a cause of multiple sclerosis

Medical management of vascular disease/risk factor modification (7 original questions)
- M1. Identify and eliminate barriers to vascular surgeons working collaboratively with PCP and cardiologists to modify atherosclerotic risk factors
- M2. Compare preoperative pathways for cardiac risk stratification in patients undergoing major vascular procedures
- M3. Compare the effectiveness of various medical regimens (antiplatelet, anticoagulation, lipid-lowering agents, etc) in maintaining or enhancing patency of grafts and other interventions
- M4. Define the most significant risk factors for PVD and the role of intervention in reducing PAD
- M5. Define the role of medical optimization before open or endovascular peripheral intervention
- M6. Develop and compare effectiveness of clinical strategies to reduce cardiovascular and other perioperative complications (eg, wound) after open vascular surgery

AAA, Abdominal aortic aneurysm; *AV,* arteriovenous; *CABG,* coronary artery bypass graft; *CAS,* carotid artery stenting; *CEA,* carotid endarterectomy; *CLI,* critical limb ischemia; *CTA,* computed tomographic angiography; *DVT,* deep vein thrombosis; *EVAR,* endovascular aneurysm repair; *FMD,* fibromuscular dysplasia; *IVC,* inferior vena cava; *PAD,* peripheral artery disease; *PCP,* primary care physician; *PE,* pulmonary embolism; *PVD,* peripheral vascular disease; *US,* ultrasound; *VTE,* venous thromboembolism.

questions for consideration during the final plenary session. In addition, based on feedback received from the participants during this phase of the meeting, several questions were grouped together, collapsing these 19 questions into 14, which were then formatted into the final scoring tool (Table IV).

Final ranking. These 14 clinical research priorities were presented to the entire group (n = 36) in a plenary session. Each question was presented and discussed. The outcome of the Improved Nominal Group Technique of prioritization is presented in Table V. Notably, this plenary process did not merely ratify the results of the small group scoring exercise. The final group discussion produced a reordering of priority compared with the outcome of the small group activity (compare Table III with Table V).

Postmeeting survey. The postmeeting survey generated 25 responses from the 38 attendees (66% response rate). All respondents felt that defining clinical research priorities was an important objective for the SVS, and all felt that the meeting was worth the time they invested in it. Twenty-four of the respondents considered the process to be a legitimate mechanism to identify and establish the Society's research priorities. The results of the postmeeting survey can be viewed at http://www.vascularweb.org/research/clinicalresearch/Pages/Clinical-Research-Priorities-.aspx.

DISCUSSION

The SVS Research Council used a process that started by identifying a broad representation of clinical research questions that were important to its membership through a survey followed by refinement and prioritization by a representative panel of SVS leaders and experts in the field.

The research priorities that emerged from this process represent a combination of CER questions (#1-3, 5-6, and 9; Table V) where better evidence is needed to make the best decision possible for an individual patient given several currently available treatment options. Some of the research priorities also represent areas where clinical research is needed to develop better or new therapeutic options for certain vascular problems (#4, 7, and 8; Table V).

The current set of priorities is not meant to be permanent but rather a starting point most likely to achieve the greatest immediate impact on current clinical practice. If successful, the process will need to be repeated to update priorities as gaps in knowledge are filled, perhaps in as soon as 5 years. In addition, new knowledge will raise new questions, and changing population demographics, economic considerations, and health care system dynamics will continuously influence research priorities in vascular disease.

Three clinical issues stood out as the highest priority items for future clinical investigation in the near term. The fourth-ranking item received less than half the votes of priority #3 (Table V).

The highest ranking clinical research priority, management of asymptomatic carotid disease, is an example of how best practices evolve and must be revisited as medical knowledge advances. For many years after the publication of the Asymptomatic Carotid Atherosclerosis Study, carotid endarterectomy was the primary means to measurably reduce stroke risk in asymptomatic patients with

Table III. Small group scoring exercise outcome

No.	*Question*	*Score*	*SD*
C5	Define clinical and anatomic characteristics in asymptomatic carotid stenosis patients that place them at high risk for stroke	35.72	17.84
C3	Compare effectiveness of invasive intervention (CEA or CAS) with medical therapy for asymptomatic carotid stenosis	31.37	8.81
A8	Identify and evaluate medical therapy to prevent AAA growth	31.31	7.25
P7	Compare effectiveness of medical vs invasive therapy (open or endovascular) for claudication	30.59	7.14
A3	Evaluate US vs CTA surveillance post-EVAR	29.78	6.90
D3	Compare the effectiveness of secondary interventions to preserve existing dialysis access fistulas and grafts	28.77	5.27
P1	Compare effectiveness of initial open vs endovascular infrainguinal revascularization for CLI	28.73	6.02
V3	Develop best practices for management of chronic venous ulcer	28.43	6.54
M6	Develop and compare effectiveness of clinical strategies to reduce cardiovascular and other perioperative complications (eg, wound) after open vascular surgery	28.24	8.44
D5	Determine the effectiveness of strategies to enhance AV fistula maturation	27.19	5.78
P10	Develop algorithms for cost-effective use of lower extremity revascularization in claudication	26.89	8.99
P6	Develop algorithms for cost-effective use of lower extremity revascularization in CLI	26.84	6.76
D1	Develop a comprehensive cost-effective algorithm for hemodialysis access	24.90	4.61
M3	Compare the effectiveness of various medical regimens (antiplatelet, anticoagulation, lipid-lowering agents, etc) in maintaining or enhancing patency of grafts and other interventions	24.77	8.02
P3	Define and evaluate novel strategies for management of unreconstructible CLI including cell- and gene-based therapy	24.76	8.44
M5	Define the role of medical optimization prior to open or endovascular peripheral intervention	24.07	7.50
V5	Evaluate chronic cerebrospinous venous insufficiency as a cause of multiple sclerosis	23.89	8.78
V2	Compare the outcomes of treated calf DVT with the natural history of untreated calf DVT	23.80	10.26
V1	Determine whether prophylactic IVC filter use reduces PE/death compared with other methods of VTE prophylaxis, duplex surveillance, or both	23.49	10.17
C6	Define cost-effective algorithms for imaging carotid disease	23.16	7.14
P13	Evaluate effectiveness of duplex scanning as a surveillance tool to identify and treat asymptomatic recurrence after endovascular intervention	22.48	8.32
P16	Develop validated quality-of-life measures for patients with vascular disease	21.95	10.70
P15	Compare open vs endovascular management of popliteal aneurysms	21.83	5.77
P9	Compare effectiveness of initial open vs endovascular infrainguinal revascularization for claudication	21.22	10.41
D4	Define the optimal approach for dialysis access in patients with central venous stenosis	19.27	6.98
P4	Define the role of primary amputation in CLI	19.22	7.33
P5	Identify the factors predicting successful prosthetic rehabilitation after lower extremity amputation	19.05	7.46
M4	Define the most significant risk factors for PVD and the role of intervention in reducing PAD	18.50	9.87
P12	Define best medical antiplatelet therapy postintervention for PAD	18.43	8.60
M2	Compare preoperative pathways for cardiac risk stratification in patients undergoing major vascular procedures	18.13	8.04
A9	Establish guidelines for AAA screening and define the "high-risk" small AAAs (<5.5 cm)	17.97	8.53
D2	Define the optimal form of dialysis access for patients with unsuitable or failed forearm fistulas	17.40	9.89
M1	Identify and eliminate barriers to vascular surgeons working collaboratively with PCP and cardiologists to modify atherosclerotic risk factors	16.83	9.67
A7	Compare effectiveness of open vs endovascular repair of chronic type B aortic dissections	16.19	7.49
R1	Compare effectiveness of medical therapy vs stenting of severe renal artery disease stratified by presence of hypertension and renal insufficiency	15.97	8.94
D6	Compare the overall effectiveness of single-stage vs two-stage basilic vein transposition for hemodialysis access	15.35	6.15
C7	Compare observational vs interventional treatment for postintervention carotid restenosis	14.69	7.82
C1	Compare effectiveness of CEA vs CAS for *asymptomatic* stenosis	14.60	8.88
A5	Determine the natural history of AAAs measuring 5.0-5.5 cm in diameter	14.24	10.86
A2	Compare effectiveness of open vs endovascular repair of thoracoabdominal aneurysms (assume stratification by extent)	13.47	7.03
R2	Compare effectiveness of open vs endovascular mesenteric revascularization	12.97	6.91
C8	Define the role of simultaneous carotid-CABG revascularization	12.91	5.89
C2	Compare effectiveness of CEA vs CAS for *symptomatic* stenosis	11.63	7.63
V4	Compare the effectiveness of compression therapy or ablation with natural history in patients with superficial venous insufficiency	11.56	5.96
A6	Compare effectiveness of open vs endovascular repair of acute type B aortic dissections	11.44	9.77
A1	Compare effectiveness of open vs endovascular repair of ascending and arch aortic aneurysms	11.38	6.35
P11	Compare duplex vs arteriography as completion study after surgical lower extremity bypass	10.86	5.11
A4	Compare treatment vs observation in AAAs measuring 5.5-6.0 cm in diameter	10.54	8.18
P2	Compare effectiveness of staged vs simultaneous amputation in patients undergoing lower extremity revascularization with toe or forefoot gangrene	10.30	5.41
C9	Define the optimal management of patients with low-frequency carotid artery-related pathologies (eg, hyperperfusion syndrome, dissections, FMD)	8.72	4.33
C4	Compare effectiveness of invasive intervention (CEA or CAS) with medical therapy for *symptomatic* carotid stenosis	8.53	5.80
P8	Define the role of infrapopliteal revascularization in diabetics before clinical CLI develops	7.97	6.80
P14	Evaluate methods of diagnosing and treating lower extremity entrapment syndromes	7.37	3.93

AAA, Abdominal aortic aneurysm; *AV,* arteriovenous; *CABG,* coronary artery bypass graft; *CAS,* carotid artery stenting; *CEA,* carotid endarterectomy; *CLI,* critical limb ischemia; *CTA,* computed tomographic angiography; *DVT,* deep vein thrombosis; *EVAR,* endovascular aneurysm repair; *FMD,* fibromuscular dysplasia; *IVC,* inferior vena cava; *PAD,* peripheral artery disease; *PCP,* primary care physician; *PE,* pulmonary embolism; *PVD,* peripheral vascular disease; *SD,* standard deviation; *US,* ultrasound; *VTE,* venous thromboembolism.

Table IV. Final scoring tool
SVS clinical research priorities
Instructions: You have $20 to spend. Using the grid below, spend your entire $20 on the clinical research question(s) you consider the top priority. Spend in $1 increments only

Question	*Dollars*
Define optimal management of asymptomatic carotid stenosis (C3 & C5)	
Identify and evaluate medical therapy to prevent AAA growth (A8)	
Compare effectiveness of medical vs invasive therapy (open or endovascular) for claudication (P7 & P10)	
Evaluate US vs CTA surveillance post-EVAR (A3)	
Compare effectiveness of secondary interventions to preserve existing dialysis access fistulas and grafts (D1 & D3)	
Compare effectiveness of initial open vs endovascular infrainguinal revascularization for CLI (P1 & P6)	
Develop best practices for management of chronic venous ulcer (V3)	
Develop and compare effectiveness of clinical strategies to reduce cardiovascular and other perioperative complications (eg wound) after open vascular surgery (M6)	
Determine the effectiveness of strategies to enhance AV fistula maturation (D1 & D5)	
Define optimal adjunctive medical therapy to enhance the success of lower extremity intervention (M3 & M5)	
Define and evaluate novel strategies for management of unreconstructible CLI including cell- and gene-based therapy (P3)	
Evaluate chronic cerebrospinous venous insufficiency as a cause of multiple sclerosis (V5)	
Compare the outcomes of treated calf DVT with the natural history of untreated calf DVT (V2)	
Determine whether prophylactic IVC filter use reduces PE/death compared with other methods of VTE prophylaxis, duplex surveillance, or both (V1)	
	Total = $20

AAA, Abdominal aortic aneurysm; *AV,* arteriovenous; *CLI,* critical limb ischemia; *CTA,* computed tomographic angiography; *DVT,* deep vein thrombosis; *EVAR,* endovascular aneurysm repair; *IVC,* inferior vena cava; *PE,* pulmonary embolism; *US,* ultrasound; *VTE,* venous thromboembolism.

Table V. Final group scoring
SVS clinical research priorities (in order of priority 1-9)

Rank	*Score($)*	*Clinical research question*
1	178	Define optimal management of asymptomatic carotid stenosis
2	168	Compare effectiveness of medical vs invasive therapy (open or endovascular) for claudication
3	129	Compare effectiveness of initial open vs endovascular infrainguinal revascularization for critical limb ischemia
4	62	Develop and compare effectiveness of clinical strategies to reduce cardiovascular and other perioperative complications (eg, wound) after vascular intervention
5	61	Define the effectiveness of strategies to enhance arteriovenous fistula maturation and durability
6	47	Develop best practices for management of chronic venous ulcer
7	36	Define optimal adjunctive medical therapy to enhance the success of lower extremity intervention
8	32	Identify and evaluate medical therapy to prevent abdominal aortic aneurysm growth
9	7	Evaluate ultrasound vs computed tomographic angiography surveillance postendovascular aneurysm repair

Other questions listed in Table IV received no votes during final scoring exercise.

significant carotid stenosis.[5] However, since the Asymptomatic Carotid Atherosclerosis Study, and with the publication of the Carotid Revascularization Endarterectomy Versus Stenting Trial study, carotid stenting is now considered by many to be an alternative to endarterectomy.[6] In addition, the natural history of asymptomatic carotid stenosis may have been altered and improved with modern medical management (eg, statins). Therefore, many vascular specialists now regard operative or catheter-based treatment of asymptomatic patients with high-grade carotid stenosis as an area of equipoise. Others question the value of intervention altogether given that better medical therapy may have reduced the already small absolute stroke risk reduction observed in older trials such as the Asymptomatic Carotid Atherosclerosis Study.

The optimal management of vasculogenic claudication has not been defined. The recently published Claudication: Exercise Versus Endoluminal Revascularization trial suggested that noninterventional therapy was as effective as stenting if the measured outcome is treadmill walking distance but studied a highly select population with aortoiliac disease and did not include an open surgical arm.[7] Another recently published trial of supervised exercise compared with percutaneous angioplasty in claudicants with femoropopliteal disease also failed to show the conclusive evidence for superiority of interventional treatment.[8] Again, this trial did not include a surgical arm. These results are sobering for vascular specialists who have anecdotally witnessed patients experience dramatic relief of vasculogenic claudication with mechanical intervention. At a

minimum, these studies indicate that more research is needed to better identify those patients most likely to benefit from invasive treatment. The optimal role of surgical intervention in the management of vasculogenic claudication relative to other options remains unaddressed.

Which patients with critical limb ischemia should be initially treated with endovascular or open surgical revascularization is also highly controversial, and little widely applicable information in this area has emerged since publication of the Bypass vs Angioplasty in Severe Ischaemia of the Leg trial.[9-11]

As a professional society devoted to the comprehensive management of vascular disease, the SVS offers these heavily vetted research priorities to the vascular and broader medical community for consideration. The SVS Research Council is developing programs for the coming years based on this foundation to accelerate generation of new knowledge in these pivotal areas. Funding agencies such as the National Institutes of Health, Veterans Administration, and American Heart Association will be invited to consider the priorities identified during this initiative and will be encouraged to develop targeted research opportunities addressing these critical priorities, where allocation of resources is likely to generate the greatest return on investment and patient care benefit.

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AUTHOR CONTRIBUTIONS

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Analysis and interpretation: LK, MC, RG, MK, CO
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Overall responsibility: LK

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